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ABSTRACT

Besides identifying current problems in educational change research, this document describes the inadequate paradigm on which past research has been based and outlines a currently emerging paradigm of educational innovation. The author asserts that previous research findings have been inconsistent and not comparable. Basic to the research problems has been the "technological-experimental" paradigm of the 1950s-1960s, which perceives school innovation as a process of experimentally testing and replicating uniform new technologies and then disseminating the best technologies to schools. The paper sketches three general propositions of the emerging paradigm. First, outcomes of educational innovation depend mostly on implementation. Second, the educational change process includes three nonlinear subprocesses: mobilization, implementation, and institutionalization. Third, the outcomes of educational innovation are based on each innovation's contextual conditions and time frame. For future research in this paradigm, the author suggests five categories of contextual conditions, including (1) district, school, student, and community characteristics: (2) attributes of the innovation and of change efforts: (3) local policy choices on participation and other matters: (4) variation in attitudes, planning, and other factors within the change process: and (5) external factors such as funding or regulation. (RW)

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TOWARD AN IMPLEMENTATION PARADIGM OF EDUCATIONAL CHANGE

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TOWARD AN IMPLEMENTATION PARADIGM OF EDUCATIONAL CHANGE

Research on knowledge utilization and educational change is undergoing a dramatic transition. The shared understanding among researchers about how knowledge utilization and eduactional change should be defined and analyzed--in short, the predominant research paradigm--is different today than twenty years ago. Though these differences partly arise from altered political and cultural contexts, they also, and more fundamentally, reflect two decades of research findings that seriously challenge views prevalent during the fifties. This paper contends that the accumulation of empirical studies point toward new ways of understanding, thinking about, and doing research on knowledge utilization and educational change.

It is sometimes hard to appreciate how substantial progress at the paradigmatic level has been because the state-of-the-art at the level of specific findings and of practical advice appears to be in disarray. The past two decades' studies have indeed produced a multitude of findings, but these findings generally are not comparable and the accumulation of specific hypotheses that have been subjected to testing has not occurred. If one naively assumes all research is equally credible--as many reviews unfortunately do--the list of variables based on research or pseudoresearch numbers in the hundreds (see Zaltman et.al., 1977; Glaser, 1975). So many variables are little better, and may be worse, than having no research results. And the prevalence of contradictory findings only heightens this confusion. Waht does the poor researcher--let alone the practitioner or policymaker--do when faced with some studies that "demonstrate" that, for example, staff participation helps to produce successful innovations and other studies "prove" the opposite? Researchers have little choice but to start carte blanche and find out for themselves whether participation matters and, if so, in what direction. Yet, in doing so, researchers suspect their research will not settle the question, just as preceding research had not. There are at least five reasons for this non-cumulative hodge-podge.

First, studies have different objectives, ranging from generation of academic theory to evaluation of programs for government agencies to facilitation of intervention activities (e.g., OD work). The objectives profoundly affect research design, focus, sample, presentation of results, and so on, and thus lead to non-comparability of studies and findings. Similarly, researchers approach studies from different perspectives, as the companion piece by House argues, which influences their work as well as their interpretations.

Second, the measurement and indeed conception of independent and dependent variables are seldom the same in the research reviewed here. For example, the concept of "success" has been defined so differently by researchers that one researcher might measure success whereas another might record failure for the same innovation. Fullan and Pomfret (1977) convincingly argue that studies can be categorized into whether they use a fidelity definition of success or an adaptation definition; such differences may be more attributable to researchers' theoretical orientations than to any objective situation. Independent variables like participation also have discrepant meanings in different studies and often are not defined precisely (Giacquinta, 1973). With variables differing widely in both conceptualization and operationalization, the assessment of findings across studies is tenuous.*

Third, the unit of analysis--e.g., individual (teacher, etc.) school, school district, local system--also differs and often renders cross study judgments problematic. For example, "adoption of an innovation" can have different meanings if the unit of analysis is a teacher in one case and a school district in another. Moreover, the unit of observation may differ, despite similar units of analysis. For example, it is common, though usually poor methodology, for data collected from teachers to be averaged to the school level, ignoring variation across teachers within schools. The comparison of findings

*Glass (1976 & 1979) uses systematic coding and statistical analysis of findings to integrate research literatures and cull out specific findings exhibiting a high level of agreement across studies

from such aggregated data to findings from data collected at the school level is often questionable.*

Fourth, many studies inadvertently confound analysis of process with analysis of variation. Mohr (1978) presents a persuasive case that process and variance analyses represent different approaches to theory development and that mixing them leads to "confusion and stagnation of theory development.

For example, Charters and Pellegrin's (1971) case study of differentiated staffing in four high schools describes the process of a failure to implement an innovation--namely, limited initial planning, frustration during early implementation, conflict, and abandonment of the innovation. When Charters and Pellegrin conclude that successful innovation requires explicit planning, they implicitly treat one of the events, the lack of planning, as if it were a variable. But their case study data did not have variation in either the dependent variable (the projects were all abandoned) or the independent variable (the projects all had little planning). Should their inference about planning, and those of other case studies which arrive at a similar inference (e.g., Wacaster, 1975; Gross et al., 1971; Smith and Keith, 1971) be considered reliable? Despite the insight these case studies provide about the *process* of change, their *variance* type conclusions cannot be completely trusted. They dealt with failure, not success, and it is surely specious to reason about the causes or conditions of success from non-success. To draw inferences about success based on evidence of failure is particularly mischievous in educational change, because we have learned a simple, if painful, lesson: there are many ways to fail, but few to succeed.

Moreover, assuming that process studies of *success* were to show that pre-planning is linked to success, it would not be logically true that pre-planning invariably leads to success, nor that it increases the probability of success more than marginally. Process

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*The subject of the appropriate choice of a unit of analysis is complex. For discussion, see Gilbert, Light, and Mosteller, 1975; and Light, 1979.

theory has a "pull-type' casuality (Mohr, 1978), in which the final effect (e.g., successful implementation) implies that a prior event (e.g., pre-planning) occurred. Such information is important for theory and practice, but it should not be confused with a "push-type" casuality from variance analysis in which variation in an independent variable (e.g., amount or type of pre-planning) is used to explain variation in the dependent effect (e.g., successful implementation). It is thus possible for process analysis to find that a variable (i.e., an event) is "important" to success in a particular case and for variance analysis to find that the same variable is not statistically "significant" over many cases. These findings would not be contradictory, just different.*

The point of this extended argument is that both process and variance theory are needed; they lead, however, to different types of inferences, so that those who equate results from one type to those from the other harm both.

The fifth reason for the state of confusion about educational change is ultimately most fundamental and is the one this paper focuses on: The very inconsistency of research findings over the last decade may reflect educational reality, not simply inadequate methodology. Empirical studies have exposed how complex educational change is, and have consistently challenged the possibility of simple, comparable generalizations. For reasons discussed in the remainder of this paper, research on educational change may no longer justifiably be able to test general hypotheses of a simple form--e.g., the New Math (or computer assisted instruction, or the Bank Street Model, or a particular curriculum revision, etc.) improve student outcomes, all other things being equal. Such hypotheses often may be essentially meaningless, not just true or false. No wonder many researchers and

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*They might, however, lead to contrary policy actions. For example, school district officials might want to follow the conclusion from process analysis because they want their particular project to work. Federal or state officials might place their bets according to a variance analysis that suggests how much weight each independent variable has in influencing successful implementation because they aim to obtain as many successes as possible.

policymakers reared in the experimental tradition see confusion rather than progress.

But progress at the paradigmatic level is real. Significant advances have occurred in ways of thinking about educational change, despite the often tedious and contradictory details of research findings. Research is at a new plateau, in which the simpler views prevalent during the fifties are being recast in more complex images of how school districts respond to pressures for change. The current confusion, inconsistency, and impracticality of research findings is symptomatic of this shift in paradigms.*

This paper reviews research on educational change. The literature is too voluminous to cover exhaustively. Fortunately, several excellent reviews of specific research findings exist and will be used throughout this essay. My aim is not an inventory of results because of the contradictory and unstable nature of findings, as discussed above. Instead, this paper describes the nature of the paradigm shift. The next section briefly identifies assumptions underlying research and policy during the fifties and sixties and suggests how research of the late sixties and early seventies challenged these assumptions; the third section proposes three meta-propositions that encapsulate a new, emergent paradigm. The paper concludes with some reflections on future research.**

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*I believe this shift is part of a much larger movement unfolding in the social sciences as they separate from their physical sciences ancestry. In line with Kuhn's (1970) observation about paradigm shifts, various writers have noted the incompatibility of research findings with the usual (physical) scientific paradigm (e.g., in psychology see Cronbach, 1975). Some writers suggest this shift is toward a "systems" theory (Churchman, 1979) or a "holistic" paradigm (see Walker, 1979 for a provocative discussion of mechanistic versus holistic paradigms and their relationship to theories of implementation); others see a trend toward a phenomenological formulation (Schutz, 19__). It is beyond the scope of this paper to trace these developments or to place the change in research on knowledge utilization and educational change into the broader context of the potential "revolution" of social science.

**This paper does not draw inferences about policy or practice so as to present a clear message about the state-of-the-art in research on educational change. Moreover, it neither reviews the methodological literature on evaluation nor suggests direct implications for conducting evaluations.

UNFREEZING THE TECHNOLOGICAL-EXPERIMENTAL PARADIGM

Before proceeding to assess the current state-of-the-art, I shall briefly identify assumptions underlying much of the research during the 1950s, 1960s, and early 1970s on knowledge utilization and educational change. These assumptions are not easy to locate because research and policy were so intertwined. Educational policymakers at local as well as federal levels looked to scientific knowledge, research and development, and systematic analysis (House, 1974),* and they as well as researchers often seemed to act as if their prescriptions had a sound research basis. They generally did not. Giacquinta's (1973) assessment of this period is none too harsh:

> Most empirical reports reviewed were atheoretical efforts to make changes, not efforts to test theories of change. The absence of critical attention to the methodological and statistical procedures used in these studies reflects this emphasis on precipitating change rather than studying it. (p. 178).

Moreover, many researchers and evaluators seemed to share--or at least by their silence to consent to--the perspective prevalent among policymakers: a reform urgency, a faith in central direction from the federal government, a belief in the benefits of Research and Development strategies, and an optimism about innovation.

This paper's task, however, is to identify the predominant research paradigm of the period, rather than to explain its policy context. The reader should nonetheless be advised that research can be more easily separated from policy now than it could then. Consequently, policy perspectives will encroach on our presentation.

A major portion of the research-policy community seemed to believe that educational change was a problem amenable to technological solutions in the following sense. Schooling--or, more precisely, dominant aspects of the teaching-learning process--were thought to

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*This trust in science, technology, and rational analysis during the fifties and sixties was by no means limited to education, as Nelson (1974) observes.

encompass tasks that could be described and replicated, akin to some procedures and practices in agriculture, medicine, or manufacturing. With research knowledge as the base, developers could produce descriptions of new tasks for teachers. These descriptions, which I shall call a *technology*, could be embedded in an overall curriculum change, an innovative project, or a school improvement program.* Using experimental or quasi-experimental methods, researchers and evaluators could test to determine which technologies--innovations, projects, models, educational methods, and so on--were most effective at the local level. There was a belief, in summary, that schooling could be improved if tested and replicable products (technologies) were disseminated widely to schools: practitioners would adopt these technologies if they had information about them and resources to install them.**

I shall call the research paradigm implicit in the above policy-research perspective, the technological-experimental (TE) paradigm. The policy belief that developers could produce replicable products had its counterpart in a corresponding research assumption that new technologies were *fixed and constant treatments*, as required by experimental design. Research conducted in the 1960s and early 1970s provided evidence that seriously challenged this assumption. The next section reviews this research, but a brief sketch of the policy-research issues may illuminate the assumption of a fixed and constant treatment.

The Head Start and Follow-Through Planned Variation experiments illustrate the prevailing view in the late 1960s that research and evaluation could choose superior technologies by employing experimental

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* See the Appendix for definitions of technology and other relevant terms.

** For an explicit statement of this Research, Development, and Diffusion strategy set in the policy context of central direction from federal agencies, see Clark and Guba (1965). Also see Brickell (1961) for a view from the state perspective. Guba and Clark (1974) later presented a view of educational change that is more consistent with the paradigm discussed within the next section.

or quasi-experimental methods.* Though the actual research design was complicated, the basic methodological idea involved in the planned variation approach seemed simple enough: select several promising educational models that addressed the problem of educationally disadvantaged children but varied in their programmatic content (i.e., their technologies); apply the treatments in a number of school settings under experimental conditions, or as close to experimental conditions as the researchers could realize; measure student performance before and after treatments and compare results across treatment and control groups. In this way, successful educational models could be identified.

But evaluators of Head Start and Follow-Through did not find a consistently effective model or variation. Many reasons have been advanced for this non-result, including a variety of methodological criticisms of the research design and how it and the federal experiment was executed. This paper's concern, however, is with an explanation that has consequences beyond the programmatic issues of Head Start and Follow-Through or the administrative feasibility of federal experiments in the social arena. In the words of one of the model developers (Weikart and Banet, 1975) there was a "gap between a model-as-conceived and a model-as-implemented." The *same* model was often implemented *differently* in different classrooms, and implemented models also varied over time in the same settings.** This unplanned variation is surely an important explanation of why Head Start evaluators sometimes found more variation in the student outcomes from classroom to classroom nominally using the same model than they did among classrooms using different models (Lukas and Wohlleb, 1973).*** Treatments were not fixed and constant, contrary to the assumption implicit in the TE paradigm.

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*For a discussion of the research design and the policy context of Head Start and Follow-Through, see Elmore (197_), House (197_), and Williams & Evans (1969). Rivlin (196_) offers an explicit rationale for the experimental approach, which she later reconsidered in Rivlin and Timpane (197_); also see Riecken, et al. (1974).

**Weikart and Banet (1975) indicate that implemented models not only changed over time but also different models tended to converge over time, a finding similar to the convergence of the mini-schools in the so-called voucher experiment (Weiler, 197_).

***Similarly in different programs, Evans and Sheffler (1974) found as much difference in instructional procedures among teachers using Individually Prescribed Instruction (IPI) as between IPI and non-IPI teachers.

This example from a planned experimental program shows how researchers and policymakers assumed new technologies were the key to school improvements. A focus on the technology itself also characterized the vast majority of change programs that were not designed or evaluated as experiments. Stated in non-experimental terms, many policymakers, practitioners and researchers assumed that educational change was a *technologically-dominant* process in which the results of an innovation depended primarily on the quality of the educational method--often thought of as a replicable product--not on its user or setting.*

Research and policy consequently focused on how to get users to adopt "validated" innovations. It was assumed that *adoption* of successfully demonstrated projects was a sufficient as well as a necessary condition for improvement.

Federal policies of disseminating information about new practices, providing seed-money funds to stimulate adoptions, promoting demonstration projects to show-off exemplary innovations, and establishing ways of "validating" practices all seemed perfectly sensible and in accord with the primacy of adoption.** Following traditions from technologically-dominant fields such as agriculture, researchers or academics presented models for policymakers and practitioners that focused on (a) atributes of innovations that made them more likely to

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*The most extreme statement of technological dominance was a call for the development of "teacher proof" practices. In this view held by some developers, the individual teacher was the culprit, being either inadequate or out of date, and the solution was to produce procedures that would compensate for and guard against user deficiencies. When evidence cited in the next section began to accumulate revealing ineffectiveness of many R&D products and packages, far too many researchers and public officials drew the conclusion that school staff were unable or unwilling to use the technologies in their intended way--the user "problem" again in a different guise. In this view, resistant practitioners failed to use superior technologies properly, an interpretation that unfortunately lingers on. See Fullan (1972) for a review and sensitive discussion of the limited attention paid to users during the 1950s and 1960s.

**Federal policymakers were not the only believers in devising schemes for adoption. Ford Foundation, for example, also had faith in a "lighthouse" demonstration approach, but their experience failed to support their faith (Ford Foundation, 1972).

to be adopted, and (b) characteristics of school districts that made them more likely to adopt innovations sooner.

Carlson's (1965) work is perhaps the best example of research that studied characteristics of early or frequent adopters of innovations. This research emphasized the individual as adopter, rather than the school district organization. By so doing, it missed much of the organizational dynamics of adoption, as subsequent researchers have pointed out in no uncertain terms (Baldridge, 1975). I shall return shortly to how a shift to an organization focus radically changed the context of inquiry into educational change.

But the early adoption studies committed a more serious conceptual error. They told only part, perhaps the least important part of a complex story. They allowed the reader to assume that adoption was tantamount to execution, so that a school district recorded as having adopted the New Math, for example, could be assumed to be using it in pretty much the way it was intended by its developers. Seymour Sarason's (1971) insightful reflections on his experience with the New Math and other change efforts showed that they were hardly implemented at all. Smith and Keith's (1971) in-depth case study of an organizational change effort in an elementary school showed that considerable general agreement existed at the time of adoption, but nonetheless the innovation was abandoned. Gross et al. (1971) documents a similar failure of implementation after adoption, as does a number of other case studies (e.g., Charters & Pellegrin, 1972; Wacaster, 1973; Bredo & Bredo, 1975). The next section cites further evidence that shows that the mere adoption of an innovation should not be counted as a successful innovation.

Where does this leave more recent studies of adoption? The work of Baldridge (1975), Corwin (1975), and Daft & Becker (1978) explicitly acknowledge that they are studying innovativeness--the propensity to adopt innovations--and not equating such studies with successful innovation. They do in fact attempt to relate broader organizational and contextual variables to innovativeness. For example, Baldridge (1975) used aggregate data from Illinois and from a Stanford Center study of schools in the San Francisco Bay Area to argue that organi-

zational and environmental variables matter. Corwin (1975) found that teacher characteristics within schools (including the number of teachers having graduate degrees) explained 12 percent of the variance in innovativeness at 131 schools. Daft and Becker's (1978) thoughtful study of 13 innovative high schools also suggested that professionalism of the staff is related to innovativeness. They further indicate that other organizational and environmental variables affect innovativeness, but they went considerably further than Baldridge and Corwin in examining the adoption process and in conceptualizing it in empirically-based terms.

In conslusion, studying innovativeness per se enables researchers to compare similar studies in other fields. Findings about innovativeness can be misleading, however, because in the context of educational change they represent partial analysis of an integral process. Until they are embedded in the full process of educational change, the "findings" must be treated cautiously.*

Finally, this brief review of the technological-experimental paradigm--and its slow unfreezing--would be remiss if I ignored the peculiar use of various models of educational change--e.g., Research, Development, and Diffusion; Problem Solving; Linkage, etc.** The formulations typical of this genré were presumably descriptive, though description was seldom based on research findings and the line between description and prescription was never clearly drawn (as Sieber, 1974 observes). For present purposes--

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*It is possible that the more school districts innovate, the less they change. For example, Berman and Pauly (1975) found that innovativeness of a district was not highly correlated with the continuation of innovations after the end of federal funding for 293 innovations sponsored by four federal "seed money" programs. Zaltman et al. (1973) suggest that organizations who concentrate on adoption may be less able to implement innovations effectively. Berman and McLaughlin (1979) present case study evidence of how organizational dynamics within school districts can operate to use innovations for maintaining the existing system, rather than changing it.

**See Havelock (1970) for a widely cited discussion of models. See Paul (1977) for an update on the formulation of models.

identifying research beliefs, rather than policy perspectives--the distinctive feature of these models was their rationalization of school district behavior vis-a-vis the change process. That is, the following type of assumptions were made by different writers at different times: (1) school officials adopt innovations to pursue educational goals; (2) they are motivated by a "performance gap," which is a discrepancy between district needs and accomplishments (Zaltman, et al., 1977); (3) they actively search for alternative innovations to fill this gap; (4) they discard innovations that are not effective; (5) the school district organization acts as coherent system; and (6) the process of educational change is a linear sequence of stages. The evidence reviewed in the next section clearly disputes the law-like status of these assumptions, as we shall see.

More pointedly, despite their shaky research foundations, these models shared a common faith with many experimental and correlational studies: they accepted the possibility and necessity of empirical generalizations, *a la* propositions in the physical sciences, that could be formed into predictive models or general explanatory theories of school district behavior. This belief was consistent with the predilection of federal and state policy toward uniform incentives, rules, and guidelines for school districts. Once again, the evidence presented in the next section questions whether the search for nomothetic propositions and the research strategy of testing for simple hypotheses are likely to be fruitful.

In summary, the TE paradign assumed that educational innovations were like technologies that could be replicated faithfully by school districts; that innovations could be evaluated as if they were fixed and constant treatments; that the process of educational change was technologically-dominant and could be described rationalistically; that adoption--often conceived of as individual, instead of organizational terms--was a sufficient condition for change; and that general models composed of law-like propositions could be developed to describe school district behavior in response to change efforts.

Federal and state policies that accepted these assumptions have often not been effective. And empirical research has found these premises to be questionable. The conditions thus seem ripe for an unfreezing of the old paradigm and the emergence of a new, more realistic understanding of the process of educational change. The next section explores this prospect.

META-PROPOSITIONS OF A NEW PARADIGM

The focus of research studies in the last five or perhaps ten years has shifted dramatically. Research has changed emphasis from analysis of replicable products to studies of process; from fixed and constant treatments to broad evaluations; from the primacy of adoption to consideration of the whole change process; from a quest for superior technologies to an exploration of organizational and contextual explanations of change; from the formulation of general rationalistic models of school district behavior to empirical, albeit often particularistic, findings.

These changes have challenged the validity of the technological-experimental paradigm, but articulation of a new paradigm has proceeded haltingly. Researchers and surely policymakers are understandably reluctant to abandon the comforts of coherent principles--as in the TE paradigm--for complex and amorphous statements that promise merely more understanding. The case for a new paradigm is pressing, however, because the more research we do, the more confused we seem to be at the level of specific findings, as the introduction noted. If we continue to design research and interpret findings using technological-experimental lenses, I fear more contradictions and less credible results.*

This section offers elements of a paradigm that reflects current research assumptions and tendencies, as well as cumulative findings. It is less complete than desirable, but I hope it provides material for others to build on.

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*Research on leadership exhibits symptoms parallel to research on knowledge utilization and educational change--inconsistent, confusing and impractical findings. Thus, Stogdill (1974) observes that, "Four decades of research on leadership have produced a bewildering mass of findings... It is difficult to know what, if anything, has been convincingly demonstrated by replicated research" (p.vii). The current malaise in the field of leadership research may provide a prophetic image of our future. Some writers diagnose the problem of leadership research as a need for a new paradigm that reflects, rather than ignores, research contradictions (McCall & Lombard, 1979).

The constituents of a research paradigm are shared understandings among researchers about how problems in their field of study (in this case, educational change) should be defined and approached. It thus includes conceptualizations, frameworks for analysis, partial theories, identification of key variables and events, and so on. The new paradigm will be characterized by three meta-propositions. They are called propositions to denote their empirical foundation. The prefix meta serves to warn the reader that these statements refer to ways of thinking about educational change, not specific hypotheses.

IMPLEMENTATION-DOMINANCE

Meta-Proposition 1: *Educational change typically involves an implementation-dominant process.*

As defined earlier, a technologically-dominant process is a fairly predictable change process whose outcomes are determined primarily by the characteristics of the adopted technology (educational treatment, innovation, school improvement effort, change policy, etc.). A new type of seed in agriculture, a birth control pill in health care, or a new dye-stamping machine in a factory illustrate common situations of technological-dominance, for when the seed is planted, the pill swallowed, or the machine introduced, their effects follow automatically. In these cases, the interaction between a technology and its setting--which defines implementation--is reasonably certain, or at least predictable within probability estimates.*

The contrasting ideal-type is an implementation-dominant process in which events occurring after the adoption of a technology determine outcomes to a large extent and these events cannot be accurately forecast from the content of the technology itself.

Many promising educational technologies are themselves uncertain, or as Glennan, et al. (1978) put it, they are not "well in hand." Open education, differentiated staffing, alternative schools, and team teaching, for instance, are intrinsically indeterminate technologies for two reasons: one, they require significant change in individual behavior, organizational roles, or school standard operating procedures; and two, the development of the new behavior, roles, and procedures imply considerable discretion on the part of users and, hence, cannot be fully specified in advance. The outcomes of change efforts in these cases would be uncertain regardless of the organizational setting within which

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*These illustrations are too simply stated for they all refer to "hard" technologies. Thus, it might appear that technology-dominant processes involve only "hard" technologies, whereas implementation-dominant processes involve "soft" technologies. Put more precisely, if the interaction between a technology and its setting is uncertain, then it is an implementation-dominant process (see Berman, 1978). Such uncertainty can occur in the implementation of hard technologies (e.g., computer assisted instruction) as well as in soft technologies, (e.g., open education).

they are implemented.

In contrast, some adopted technologies can be highly certain. This paper calls a technology certain insofar as it can be divided and subdivided into tasks that can be replicated faithfully by users regardless of their idiosyncracies. Minor alterations in curriculum or school procedure often fit this definition, as do such "innovative projects" as field visits to the zoo (funded by the former Title III of the Elementary and Secondary Education Act) or career education innovations comprised of placement tests and reading materials (funded by the Vocational Education Act, Part D, Exemplary Programs). Major federal programs also can have components whose change requirements are determinate. For example, Title I's monitoring and accounting procedures, which are assigned to insure the required disbursement of funds to schools with economically disadvantaged students, consists of pre-determined rules that do not imply significant role or organizational change on the part of teachers or administrators. Notwithstanding the certainty of these types of change efforts, their implementation can be rocky. Procedures for the use of Title I funds illustrate the point. The program initially experienced overt resistance and symbolic compliance from school districts, despite the ease with which these procedures could be specified and replicated (see Murphy, 197_ for an account of Title I's early years). But school districts have now by-and-large accepted the requirements; implementation is routine after thirteen years of federal persistance (Kirst and Jung, 1980).

In short, the interaction between an educational technology and its setting can be uncertain because of the technology's characteristics or how it is used. Whatever the cause of uncertainty, this paper calls the resulting process an implementation-dominant process.

Cumulative empirical findings from the last decade's research, as discussed in this section, strongly support an implementation-dominant view of educational change (excluding change efforts that are essentially minor or mechanical alterations in curriculum, school procedures, or administrative rules). The best research and evaluation, whether qualitative or quantitative, suggest that how an innovation is implemented may be as important to outcomes as its initial technology. The innovation's substance surely constrains what happens after adoption--thus, adopted reading programs usually wind up being about reading,

and bilingual education programs turn out to involve bilingual instruction. Wide variation nonetheless can occur within the constraints implied by the initial content of an adopted innovation. Let us review evidence for these assertions as they have evolved over the past decade or so of research.

A variety of carefully documented case studies identified implementation problems, rather than content, as reasons for failures of innovations (Smith and Keith, 1971; Sarason, 1971; Gross et al., 1971; Charters and Pellegrin, 1972; Wacaster, 1975; Bentzen, 1974; Bredo and Bredo, 1975). The general findings from these process studies are supported by variance studies. Thus, Goodlad and Klein's (1970) study involving 158 classrooms of 67 schools in 26 districts provides quantitative evidence of the importance of implementation: in almost 60% of the classrooms, there was no implementation of the innovations involved, and in only 5 classrooms was the innovation implemented to a high degree. More reliable and direct quantitative evidence comes from several large scale evaluation studies. If the technology (or treatment or innovation) were dominant, one would expect evaluations to show that the same innovation produces similar results regardless of the site in which it is installed. Such was not the case in the Head Start or in the Follow-Through programs discussed earlier (Lukas and Wohlleb, 1973; Lukas, 1975; Weikart and Banet, 1975; Elmore, 1978).

An evaluation of OE's Project Information Packages (PIPs) presents further compelling evidence about implementation because it examined innovations that were specified to a greater extent than most of the educational models in the planned variation experiments (Stearns et al., 1977). The PIPs program initially involved (a) the selection of locally developed projects that had been successful in their originating sites and "validated" as exemplary by the Education Division's Joint Dissemination Review Panel, and (b) the development of these innovations into six packages that could be disseminated to new sites. The evaluation by SRI was of a two-year field test of PIPs at nineteen sites. Although at least five of the six packages were highly specified as to procedure, management, and materials, the evaluation found results that differed from site to site for the same package and did not replicate

the highly successful results in the originating site. The very specificity of the PIPs treatment (unlike the more diffuse treatments examined in the case study work) provides an acid test of whether educational innovations, which had been successful elsewhere, lead to a fairly predictable, successful outcome: they did not. Still other evidence comes from the Rand evaluation of 293 innovations in over a thousand schools in a nation-wide sample. Because of the large sample size and the wide range of innovations included in the study, there was an opportunity to determine how much project outcomes were affected by the content of the innovations, which were funded by four federal programs providing school districts with "seed money" for innovations. The researchers found that the content of the innovations had, at best, minor effects on outcomes (Berman and Pauly, 1975).

All the studies cited above as well as others suggest that outcomes of a change effort depend critically on how it is carried out. The dynamics of the process can be further expressed by the following corollary: The interaction of an educational innovation with its setting (i.e., its implementation) generally results in changes in the initially conceived innovation. The empirical evidence for this phenomena, which has been called the mutation phenomena (Berman and McLaughlin, 1974), is quite strong. The Head Start Planned Variation evaluation examined 12 educational models or technologies installed in 31 sites that included 100 classrooms and found that the same model was implemented differently by teachers within the same site (Lukas and Wohleb, 1973). The Follow-Through evaluation found similar results (Elmore, 1978) much to the dismay of federal sponsors. It could be argued that these changes or adaptations of the innovation during implementation are the result of the vague or unspecific quality of the innovation. Thus, it may not be surprising that Shipman's (1974) report on the highly unspecific innovative process for curriculum revision in 33 mostly secondary schools in Great Britain indicated wide variation from school to school. Nor is it surprising that the Rand study of a Los Angeles Unified School District reading program in which schools were given a general mandate with broad guidelines about developing individualized instruction resulted in wide variation from school to school and class

class (Armor, et al., 1978). But, as discussed above, Stearns, et al. (1977) evaluation of the PIP's field test also found considerable mutation, despite the highly specific nature of the packaged innovations.

Accepting educational change as an implementation-dominant process that intrinsically involves adaptation of the innovation to its setting implies a need to rethink many aspects of research as well as policy and practice. It is beyond the scope of this essay to do more than briefly mention one implication of particular importance for the conduct of research.

Researchers should not expect a faithful replication of innovations. Variation, not replication, is to be expected (House, 1976). Consequently, the notion of what constitutes a "successful" innovation requires--and is undergoing--drastic revision. It makes sense in a technologically-dominant process--i.e., a process in which the replication of a technology would produce a desirable result with a high degree of certainty--to consider the innovation to be successful if the installed innovation replicates the originally conceived innovation with a high degree of fidelity.* The same logic does not apply for an implementation-dominant process. In this situation, the attempt to obtain high fidelity may create implementation problems, not overcome them (Berman, 1979). Instead of measuring success in terms of fidelity per se, alternative definitions based on the expectation that adaptation will--and ought to--take place are appropriate. (See Fullan and Pomfret, 1977, and Fullan, 1978, for extended discussions of a fidelity versus an adaptation perspective).

At the present time, there are no commonly accepted measures of successful innovation based on an adaptation perspective. The adaptation perspective may imply that different definitions of success are necessary under different circumstances, a point discussed subsequently. Though the empirical studies cited throughout this review generally do not use common conceptualizations--let alone similar measurements--of success, they all employ: (1) multiple measures of the effects of

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*Gene Hall and associates have gone far in developing fidelity measurement instruments (Hall, et al., 1975, 1978).

change efforts including measures of outcomes not intended or anticipated in the original goals; and (2) measures of the process per se, in addition to--often in place of--impact measures.*

LOOSELY COUPLED PROCESS

Meta-Proposition 2: *The educational change process consists of three complex organizational subprocesses--mobilization, implementation and institutionalization--that are loosely, not linearly, coupled.*

This proposition constitutes a broad framework for the analysis of change processes in educational as well as other organization (Hage and Aiken, 1970; Zaltman, et al., 1973). The terms "subprocess," "organizational," and "loosely coupled" were chosen to symbolize a shift away from linear models prevalent under the technological-experimental paradigm. The meaning of these terms will be discussed first, followed by a synthesis of evolving views about each subprocess.**

The term "subprocess" is used rather than the more common "stage" for several reasons. First, "stage" often connotes a rational planning process, as suggested in the earlier works on planned organizational change (Bennis, 1966; Bennis, et al., 1969; Havelock, 1969; Clark and Guba, 1969). Whether school districts in fact follow a rational sequence of stages requires an empirical answer. The evidence suggests they generally do not, as shall be detailed shortly. Dropping the term "stage" may help rid the language of research of an implicit rational bias.

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*Writers on the methodology of evaluation make a strong case for both of the above points. For example, see Scriven (1967) on point (1) and Stufflebeam (1971) or Deutscher (1976) on point (2). This paper offers no definition of "successful" innovations for the reasons cited above, though the term will be used when necessary. In these instances, the definition used by the cited research study will be accepted without comment.

**The three subprocesses named above assume many aliases in the literature, and some researchers expand their number to five or six. The various names of and divisions within mobilization, implementation, and institutionalization will be discussed as each subprocess is explained. Despite the usefulness of finer distinctions for particular purposes, the case for expanding the number of subprocesses beyond three does not seem justifiable in terms of advancing a general paradigm.

Second, "stage" implies a linear metaphor: that the process of change steps from discrete stage to discrete stage. The phenomena comprising the process attendant to a change effort is, of course, a continuous--i.e., linear--time-ordered flow of events involving many people and many interactions. But researchers do and must impose a theoretical structure on these events. Research statements or propositions about the process of change are, therefore, theoretical constructs and should be judged on their value to the scientific undertaking (Cronbach and Meehl, 1955). The notions of stages and a sequence of linearly connected stages as descriptive of the process of change are thus theoretical constructs, not actual events. This linear construct may have been useful in reference to problems of diffusion of technology to individual users (Rogers and Shoemaker, 1971).* It is less germane when the "users" are complex organizations, like school districts, and the technology is uncertain (House, 1971).

For example, Daft and Becker's (1978) analysis of innovative high schools found that the adoption decision generally served to legitimize choices made during proposal generation, and proposal generation itself consisted of interactions among staff and administrators. In other words, the significant part of the subprocess here called mobilization resided, for Daft and Baker's sample, in a complex iterative process, not a linear one, whose fruition was signalled by a formal decision to adopt an innovation. Miles' (1978) case studies of new schools show that planning, considered here a part of mobilization, continued throughout the innovative process and was inextricably related to implementation. Finally, to cite an example that encompasses all three subprocesses, Berman and McLaughlin (1977) examined case study and interview material about the fate of over 200 innovations several years after the close of federal funds. They found that those projects that were being institutionalized went through a process of remobilization, and, moreover, steps toward institutionalization had been taken from the projects' outset. In short, though neither these nor other studies provide a convincing theory of the subprocesses or of the overall change process, the linear stage model no longer seems adequate.

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*Recent literature on technological diffusion has moved away from, though not renounced, the linear sequence model. See Kelly and Kranzberg, 1978.

Finally, the term subprocesses is chosen because it connotes a flow of events punctuated by choice opportunities. This image is a more realistic view of organizational change than the usual decision-making or problem-solving metaphors in which decisions cause or are caused by other decisions. For example, some commentators discuss the decision to search for an innovation, leading to a decision to adopt, followed by a series of implementation decisions, resulting in a decision to continue or discontinue a project. This perspective suggests more or less rational decisions, usually by key officials, and thus introduces a top-down bias (as opposed to a user view) of change. The example cited earlier of the Daft and Becker description of proposal generation indicates that adoption decisions in their innovative high schools were almost a formality set in motion by other forces that cannot be easily described in decision-making terms. Similarly, Berman and McLaughlin's discussion of institutionalization leaves little doubt that a decision to continue or not continue an innovation is often not made--they just fade away--and, when it is, the decision may have little to do with the resulting reality. The term process or subprocess may, in short, help avoid an overly simplistic decision-making view.

If the process of educational change is not usefully described as a linearly related sequence of stages based on discrete decisions, how should it be characterized and should it be divided into subprocesses?

Educational change can be conceptualized as a process within the school district considered as an organizational system.* The state of an organization (e.g., a school district) at any time can be described by the routine behaviors of its members. From this system's perspective, organizational change is a change in state of the system--i.e., it is a change in routine behaviors. The process of change consists of the events and activities as the system moves from one state to another. Empirical observation suggests the division into three subprocesses--namely, research indicates that different actors engage in different activities during the three subprocesses, and that these activities serve different functions for the organizational system undergoing

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*The use of systems terminology has become more widespread in educational research during the last decade. See the accompanying paper by Miles.

change. The three subprocesses can be defined in system terms as follows.

Mobilization is the process whereby the system prepares for a change in state. Mobilization includes the decision to adopt a change effort or innovation, but it neither begins nor ends with this decision. Mobilization activities occur intermitantly--before, during, and after activities associated with implementation and institutionalization. This paper uses the label "mobilization," instead of such terms as adoption or initiation, to connote (a) a nonsequential, organizational process, not an individual decision; (b) an assumption that the school district is an ongoing system that selects and uses an innovation, rather than the technological assumption in which an innovation is seen as causing the system to change; and (c) a highly political and conflictual process, not the cold, rational image unintentionally conveyed by the technology paradigm.

Implementation is the process whereby the system attempts a change in state--i.e., it comprises the activities of users attempting to use an innovative idea. Institutionalization is the process whereby the system stabilizes a change in state. Because a state change consists of alteration in routine behavior, institutionalization involves activities relevant to establishing new routines. In a widely cited article, Weick (1976) suggests that school districts are loosely coupled organizations in the sense that teachers work more or less autonomously from other teachers and administrators and that schools work more or less autonomously from each other and from school district administration. As a consequence of loose coupling, implementation can occur in different parts of the system (e.g., a teacher, a grade level, or a school) at different times. Institutionalization can therefore be interspersed with implementation, as research cited later shows.

Now that the mobilization, implementation, and institutionalization have been defined, research relevant to each subprocess will be discussed in turn.

Mobilization. Mobilization encompasses an innovation's "beginnings" in a school district. Some innovations have a straightforward beginning, easily traced from problem to innovative idea for solution to adoption. For many, perhaps most innovations, however, no simple or single decision-flow can be found. Moreover, the process seems to vary for different

types of innovations and different contexts. Consequently, different authors identify and emphasize various pieces of what is coming to be regarded as an exceedingly complex phenomena.

For example, Daft and Becker's (1978) study of innovation adoption in 13 suburban high schools adds a prior stage to "adoption"--namely, "proposal generation." Rosenblum and Louis' (1979) study of ten rural school districts includes a stage called "readiness" which they postulate to be prior to "initiation." Emrick's (1977) study of the National Diffusion Network divides the beginning into initial awareness, secondary awareness, and pre-implementation training. Miles' (1978) study of five new schools within existing school districts refers to planning, which includes much of what is often included in initiation or in the subprocess here called mobilization. These theoretical and semantic distinctions make sense in the context of each study cited, which unfortunately creates confusion for developing a common paradigm. Thus, the Daft and Becker study deals with highly innovative high schools whose staff in fact generated proposals; the Rosenblum and Louis analysis was part of an evaluation of a federal program that provided money to selected rural districts so that they would introduce change and the readiness issue was implicit in the program design; the Emrick distinctions follow the steps in the National Diffusion Network's strategy; and Miles' investigation of the creation of new schools naturally focuses on the extensive planning involved in such activities. In short, these discrepant conceptualizations reflect different realities that frustrate generalization.

Nonetheless, these studies describe a similar phenomena in terms of the functioning of a school district as a system attempting change. The various activities described above comprise different organizational aspects of the system in preparation for change in the routine behavior of its members, which is the meaning of mobilization as defined earlier. A broad review of the literature suggests that the activities comprising mobilization can be grouped into four functions: (1) policy image development, (2) planning, (3) internal support generation, and (4) external support generation. Except for planning, the names of these functions may seem strange. They are used to purge research language of its overly

rationalistic bias.

The first mentioned function, policy image development, is not necessarily first chronologically. It involves a series of activities that the literature tends to describe in rational terms--e.g., awareness of a problem, perception of performance gap, needs assessment, search for solution, idea generation, proposal generation, and so on (Rogers, 1962; Rogers and Shoemaker, 1971; Zaltman et al., 1973; Zaltman et al., 1979). Yet the few studies that have actually described how and why school districts attempt innovation reveal a far more complicated, more disorderly, and more varied picture.

For example, Berman and McLaughlin (1975) found little evidence of search behavior in the adoption of innovations supported by four federal seed money programs. On the contrary, most projects in their sample were started opportunistically in order to benefit from federal largesse, not to solve pressing educational problems. Several studies have shown that political and bureaucratic considerations play a bigger role in the selection of proposals to innovate, or in the acceptance of projects from outside the district, than do educational considerations (House, 1974; Kent in Herriott and Gross, 1979; Cohen and Farrar, 1978).

Moreover, the often unchallenged assumption that perceived problems--economic, political, bureaucratic, or educational--generate solutions in the form of the adoption of innovations is open to serious question. Cohen, March, and Olsen's (1972) investigation of higher education lead them to postulate that organizations like universities are "organized anarchies" characterized by problematic preferences, unclear technology, and fluid participation of key actors in decision processes. These characteristics are similar to those described for elementary and secondary education (Miles, 1967; Hawley, 1975; Elboim-Dror, 1973; Berman and McLaughlin, 1979). In an organized anarchy, problems and solutions (i.e., innovative ideas) are not neatly linked: problems may not elicit search for solutions, and indeed, innovative ideas may "search" for problems to justify their adoption. Daft and Becker (1978) argue that this organized anarchy model provides a useful interpretation of how innovations were proposed and accepted in their sample of high schools.

The evidence seems clear that the old perception of how innovations are adopted was inaccurate both in its rational bias and in its assumption

that only one kind of process exists. Solutions lead to problems in some cases--e.g., in the internally generated proposals for innovations, described by Daft and Becker and in the sometimes serious, often opportunistic proposals to obtain federal funds studied by Berman and McLaughlin; whereas problems, particularly those derived from externally imposed conditions (Stiles and Robinson, 1973) can also stimulate solutions, though less frequently than imagined. Moreover, numerous examples in the literature of direct federal or state involvement, as in the Alum Rock Voucher experiment (Levinson, 1978), the Rural Experimental Schools Program (Herriott and Gross, 1979), the National Diffusion Network (Emrick, 1979), Programmed Information Packages (Stearns et al., 1977), and the Pilot State Dissemination Program (Sieber et al., 1972), suggest complex processes in which solutions define problems and problems mold, if not actively seek, solutions.

The organizational literature outside of education supports this view of a complex process involving much rationalization and less rationality than usually postulated (Weick, 1969). One of the few empirical studies of such decisions concludes that the "process is characterized by novelty, complexity, and openendedness, by the fact that the organization usually begins with little understanding of the decision situation it faces or the route to its solution, and only a vague idea of what that solution might be..." (Mintzberg et al., 1976).

Stepping back from the details of this process, it appears that a major function of these activities is the formation of a policy image of a future state of affairs that organizational researchers would like to see realized (House, 1978). In other words, the decision to adopt an innovation, to seek funds to innovate, and all associated activities define what a school district intends to do and communicates these intentions to various audiences, both external and internal to the district. Policy image formation is not necessarily a self-conscious effort, and the emergent image is often understood only in retrospect (Weick, 1969). Moreover, the policy image evolves and develops over time, sometimes throughout the life of a specific project (Rogers and Eveland, 1977). For example, Smith and Keith's (1971) research illustrates that organizational members can hold different images of the meaning, intent, and

substance of an innovation, and that the continuing lack of a common image can lead to frustration, conflict, and failure. Moore's (1977) in-depth study of six successful technical assistance groups and Miles' (1978) study of five new schools* suggests that successful innovations develop a policy image that becomes commonly held by project participants.

A second activity during mobilization is planning. Though planning represents the seemingly "rational" aspect of mobilization--proposal writing, assignment of personnel, allocation of resources, setting of objectives, and the like--it once again does not proceed in an orderly, linear fashion (Sarason, 1972). Miles' study of new schools is one of the few studies that systematically investigates planning and his reflection on the case study material speaks for itself: "Many important decisions seemed to flash by in seconds...'rationality' turned out to include many non-rational features...political motives were implicit in much planner/implementer behavior." (Miles, 1978, p. 49). Moreover, Miles observed that planning continued throughout the project's life and plans themselves constantly evolved. Indeed, he suggests that "meta-planning"--i.e., designing the planning process--also develops and evolves in more effective projects. Little can be concluded of a propositional nature from the empirical work accomplished thusfar about planning, except that virtually every writer believes that school district planning is extremely difficult to do well and is inadequate as currently practiced.

The remaining activities of mobilization concern the generation of external and internal support for an innovation. Though relatively little research has been devoted to understanding how support is generated from local and larger communities, there is a consensus that: such support, the lack of it, or indeed active opposition has profound effects on the change process. For example, despite the mandate for parent involvement in many federal and state programs, the evidence is

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*Miles uses the term "vision development" in a way that closely resembles this paper's policy image development. Rogers and Eveland (1979) label this function agenda setting, matching, and redefining.

overwhelming that parents and community members are seldom involved in innovative efforts (see Cohen and Farrar, 1977; Paul, 1977). Nonetheless, when community opposition is aroused, innovations can be seriously affected (Paul, 1977). And when community support is actively engaged the prospects for implementation are enhanced (Herriott and Hodgkins, 1969; Moore, 1977). More broadly speaking, the prevalence and importance of political interactions between school districts and outside sources of support clearly emerges in a wide variety of case study analyses (Smith and Keith, 1971; Gideonse in Herriott and Gross, 1979; Miles, 1978; Moore, 1977, etc.).

The generation of internal support--i.e., support of board members, district officials, teachers, and administrators--for an innovation is complex for two reasons. First of all, individuals hold different views about an innovation's educational value and its impact on themselves. These differences in perceived value and personal consequences are often cited as reasons for "resistance to change" (Gross et al., 1971; Zaltman et al., 1977; Gross in Herriott and Gross, 1979). Secondly, generating support for a project is complex because school districts are loosely coupled organizations, as Weick (1976) observes. Thus, Berman and McLaughlin (1977) argue that innovations can be supported by central district administrators, independently of support from school staff, and vice versa. They suggest that high levels of support from both the district level and the actual users of an innovation are necessary to successful innovations. Fullan (1972), Fullan and Pomfret (1979), and Paul (1977) review evidence from various studies supporting part or all of this proposition.*

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*This proposition about support generation should be distinguished from the issue of participation, which will be discussed subsequently. Many writers contend that participation leads to support, but this hypothesis has been seriously challenged as either inaccurate, imprecise, or both (Giacquinta, 1975; Rosenblum and Louis, 1979). Support can be generated by strategies other than participation--e.g., persuasion, information, or change in incentives. This article therefore considers participative strategies as a factor and deals only with the generic function of internal support generation in this section.

Though the four activities comprising mobilization--policy image development, planning, external support generation, and internal support generation have been discussed separately, they occur or fail to occur together. Research on mobilization has been quite limited, and much more needs to be done to understand how this subprocess works under different conditions.

Implementation. Unlike mobilization, the subprocess of implementation has been extensively studied during the past decade.* Stepping back from the details and richness of these studies, it is apparent that no single generic process encompasses the implementation experiences described in the literature. Cases that trace successful implementation do not present mirror images of cases that document unsuccessful processes. Successful processes do not seem robust, but rather consist of fragile concatenations of events, people, and ideas at the right time in the right place. A single missing, misplaced, or mistimed element seems likely to collapse the delicate "assembly" leading to success (Bardach, 1977). Consequently, there are many ways to fail, few ways to succeed.

Though a single theory of implementation is thus unlikely, some significant characterizations of this subprocess have been advanced that help interpret the disparate details described by case materials.

Three models of implementation represent the ways researchers currently view the process. The managerial model sees implementation

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*The term "implementation" has two meanings in this paper, as it has in the literature. Earlier, implementation referred broadly to the interaction of an innovation with its setting. The above or subprocess meaning has a narrower connotation--namely, the activities of users (e.g., teachers) actually attempting to use an innovation. The broader definition is particularly appropriate for viewing the process from afar--outside of a school district or of many districts--as a federal or state policy official might; it thus might be thought of as macro-implementation in contrast to the narrower definition that focuses on micro-implementation by users. From a macro perspective, mobilization--or at least that part which follows adoption--and institutionalization are aspects of implementation. See Berman (1978) for a fuller discussion of macro and micro implementation. For reviews of the literature on implementation outside of education, see Hargrove (1975), Elmore (1978), and Bardach (1977).

as a process whereby administrators attempt to overcome resistance to change (engendered before, during, or after mobilization) and take actions that enable implementers to do their job (e.g., gathering resources, buffering teachers from community forces or from state and federal officials, or providing training). The managerial perspective is evident, for example, in the writings of Gross (Gross et al., 1971; Gross in Herriott and Gross, 1979), and Zaltman (Zaltman et al., 1977), as well as in the literature on educational administration. The learning model views implementation as a process whereby individuals, generally teachers, attempt to learn new behavior and the organization, generally schools and districts, tries to learn how to change its coordination, control and information systems. Some of the work of Miles (1964 and 19__), Sarason (1971), Goodlad (1975), Shipman (1974), Elliott and Adelman (1974), Moore (1971), and Lightwood (1979) take the learning perspective at either the individual, the organizational, or both levels. The bargaining model views implementation as a conflictual process in which the bargaining among various stakeholders defines what is done and how. Though the bargaining perspective is most often employed to describe relationships between school district administration and "external" forces (e.g., community, school board members, federal and state officials, as in Wirt and Kirst, 1975; Boyd, 197_; Iannocone and Lutz, 1970; and House, 1974), it has also been used to describe or interpret decisions made during implementation (e.g., Baldridge, 1974; Miles, 1978; Levinson, 197_; Cohen and Farrar, 1977).

The managerial, learning, and bargaining models direct research attention to different aspects of implementation. Consequently, the findings from studies taking these perspectives can be incompatible, as are their measures of effective implementation. Despite these difficulties, it seems unlikely that only one model can capture the multiplicity of events and activities characteristic of implementation.

Regardless of the model used, two activities--adaptation and clarification--are frequently identified as fundamental attributes of implementation.

The importance of adaptation was recognized early in studies of educational change (e.g., Miles, 1964), but its full significance for understanding implementation was not identified until empirical studies began to reveal

the mutation phenomenon discussed previously. Berman and McLaughlin (1974, 1975, and 1978) argue that adaptation is so pervasive that implementation processes can be classified in terms of adaptation at the user's level. They propose that, on the one hand, the initial innovation can be adapted to classroom, school, and district, and that routine organizational behavior of teachers, principals, and officials can be adapted to the innovation. If only the innovation is changed significantly but not individual and institutional behavior, they call the process cooptation. If neither the innovation nor the organization adapts significantly, the process is one of two kinds--a symbolic implementation where everything remains essentially the same (Charter and Jones, 1973), or a breakdown in operations of the type described by such case studies as Smith and Keith, 1971; Gross et al., 1971; Wacaster, 1975; and Bredo and Bredo, 1975. If both innovation and organization adapt, the process is called mutual adaptation. Berman and McLaughlin propose that effectively implemented innovations are characterized by mutual adaptation.

What is the current status of the mutual adaptation hypothesis and of adaptation more generally? Berman and McLaughlin did not define these theoretical concepts in precise operational terms and the measurements they employed were weak. Subsequent research has explored the concepts in more depth and attempted to unravel the research--and policy--conundrums they imply. Stearns and Norwood (1977), Emrick (1977), and Moore (1977) are among the major studies that both confirm and give richer and more differentiated meaning to mutual adaptation. In particular, Moore's study of technical assistance groups documents how mutual adaptation occurs. He also raises important issues about whether mutual adaptation can occur without negating the "core" ideas defining an innovation. Other researchers have tackled the difficult operational problems of measuring adaptation and mutual adaptation. For example, Rogers et al. (1977) working on innovations in non-school public organizations developed a measurements of the degree of "re-invention"--which is synonomous to adaptation--for a computer processing information system. The measurement consists of determining how much the applied system deviates from a "main line," or core description, of the innovative idea. Rogers et al. do not measure mutual adaptation, however, and consequently their work still

focuses on the innovation, and deviations from it, as the issue to be examined. Moreover, their attempts to use similar methods of analysis on the Dial-a-Ride system were not as fruitful (Rogers, 1978). Hall and Loucks' (1977) efforts to measure the "levels of use" of an innovation are directed toward a fidelity notion of effective implementation. Nonetheless, their measurements can be reinterpreted as indicating how much adaptation occurs in actual practice as an innovation is implemented. They too do not directly measure mutual adaptation. Despite these and other serious operational difficulties, the concepts of adaptation and mutual adaptation seem established as aspects of implementation.

Clarification, the second concept that characterizes activities during implementation, is less firmly established than adaptation. Many researchers have suggested that users need to be clear about the change effort if it is to be effectively implemented (e.g., Gross et al., 1971). Earlier research took the position that roles, tasks, and plans should be specified ahead of time, before implementation. But recent research has taken a different and more sophisticated turn on this issue.

For example, Berman and McLaughlin (1977) analyzed responses of 1,072 teachers to survey questions about innovations and found specificity of goals was correlated with effective implementation of the innovations. But they found that "specificity" was not invariably achieved prior to implementation. On the contrary, highly structured innovations involving only a small amount of change (e.g., computer assisted instruction) required specificity before implementation, but less structured innovations (e.g., open education) achieved specificity during implementation. For the latter type of innovation, pre-specification could be damaging.* Moreover, Berman and McLaughlin's case study analysis of unstructured innovations suggested that achieving specificity involved learn-by-doing activities in which individuals became clearer about the project's phil-

*The work of Stearns et al. (1977) on the evaluation of Project Information Packages tends to support this generalization. The one innovation that was relatively unstructured (a gaming simulation) seemed to fail in part because of its pre-specification.

osophy as well as its operational objectives. In other words, clarification is a process whereby each user develops his or her understanding of--and belief in--the innovation as it evolves during implementation. Insofar as staff become clear in their own terms, specification can occur almost as a post hoc codification of shared understanding among participants. Moore's (1977) analysis showed how clarification can proceed from initial vague ideas to specific tasks and roles with the help of outside assistance. Rogers et al.'s (1977) research on an information-processing technique offers an explicit conceptual formulation of clarification activities, which they call specification. They trace decisions about the technology's operational definition and its use and find that "the tendency is to move toward greater specification of innovation, but this process is by no means simple and linear." (p. 14).*

In summary, implementation consists of the adaptation of an innovative idea to its institutional setting. Effective user implementation seems to be characterized by mutual adaptation at the user level and by the staff's clarification of the innovation's goals and required role behaviors. The managerial model of implementation views adaptation and clarification as tasks that project and administrative leadership must handle, channel, and control; the learning model sees them as necessary aspects of individual growth and organizational development; the bargaining model assumes that these activities are a by-product of conflict resolution. No single theory of implementation will probably be able to capture these multiple realities.

Institutionalization. This subprocess has received scant research attention in either educational or broader organizational research. The notion that institutionalization--i.e., stabilizing change within an organization--is fundamental to the full process of change is an old concept in sociology (Janowitz, 196_). Lewin's (1958) work in social psychology of individuals and small groups specified a refreezing stage after un-

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*Rogers and Eveland (1978) measure specificity as "the amount of agreement between two or more people about some characteristic. When people agree, specificity is high." (p. 7). In contrast, Berman and McLaughlin define both specificity and clarity in individual terms, not necessarily as agreement among staff. This difference illustrates only one of the many hurdles to overcome in developing operational concepts.

freezing of old patterns and learning of new ones. However, Hage and Aiken's (1970) analysis of routinization--following initiation and implementation--updated the concept and placed it squarely in an organizational context.

As for empirical studies, Ford Foundation's (1972) report on their experience with "light-house" projects showed few lasting effects after the foundation's grants had terminated. Berman and Pauly (1975) and Berman and McLaughlin (1977) studied the institutionalization of about 300 innovations funded by federal "seed money" and found that most innovations, even successfully implemented ones, did not last long after the end of federal funding or were so emasculated that their impact on the school district and students were minimal. Yin (1979) examined hard technologies installed in a variety of public organizations and came to a more optimistic assessment of the routinization of innovations in his sample. Rosenblum and Louis (1979) analyzed ten rural school district participants in the Rural Experimental School Program to determine the degree of routinization of changes associated with the program. Miles (1978) studied the stabilzation of new schools and found stabilization to be a complex and fragile process, as did Roger et al.'s (1977) study of 53 adoptions of a computer information processing system installed in public organizations.*

Though this literature does little more than scratch the surface of an important research and policy problem, it does suggest several concepts that future inquiries might pursue. Berman and McLaughlin (1977) contend that loose coupling within school districts implies that institutionalization involves different processes at the user and district levels. Teachers and school staff need to <u>assimilate</u> what they have learned during implementation; districts need to <u>incorporate</u> new routines engendered by the innovative process into decisionmaking about budget, personnel, support services and instruction. Berman and McLaughlin argue that change developed during implementation is unstable, isolated, or merely symbolic unless <u>both</u> assimilation and incorporation occur to a high degree.

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*Institutionalization goes under different names in the literature. The authors mentioned above use the following labels: Lewin, refreezing; Hage and Aiken, routinization; Berman and McLaughlin (1974) accept Giacquinta's (1973) incorporation, but later (1977) use institutionalization; Yin, routinization; Rosenblum and Louis, routinization; Miles, stabilization; Rogers, interconnecting.

Whereas Berman and McLaughlin's measurements of incorporation are weak, Yin's (1979) analysis of hard technologies offers the possibility of powerful operational measurements of this aspect of institutionalization. He proposes that routinization (i.e., incorporation) can be measured by the number of organizational passages (which are discrete decisions marking the transition of an innovation from one status to another with the organization) and cycles (e.g., budget reviews) that a new practice survives.

The subprocess of institutionalization, like mobilization and implementation, cannot be described in simple rational terms. The district's loose coupling requires complex conceptualizations and measurements. Moreover, case study materials in Berman and McLaughlin (1977) and in Herriott and Gross (1979) describe incorporation as a highly political process, involving bargaining within the outside of the district, in which the innovation's educational success plays a distinctly secondary role.

THE CONDITIONAL NATURE OF EXPLANATION AND PREDICTION

Meta-Proposition 3: *Outcomes of educational change efforts tend to be context-dependent and time-dependent.*

The preceding meta-propositions concern the educational change process qua process, whereas meta-proposition three refers to how researchers are beginning to--or should--think about explaining variation in outcomes. The process statements are related to the variance statement listed above, for meta-propositions one and two imply three, as this section explicates in detail.

Meta-proposition three requires considerable discussion. Before doing so, however, an alternative formulation might clarify the statement. Research traditionally aims to identify factors affecting outcomes of educational change efforts, to determine the direction of their effects, and to estimate how much each factor influences outcomes. The usual form of an hypothesis is: a standard variation in factor X produces b variation in dependent variable Y, all other things being equal.

But, in research on educational change, hypotheses of this simple type have seldom been confirmed by successive studies. This section contends that one among several reasons for such inconsistency is that the *ceteris*

paribus is too far reaching; rather, statements of the following form seem better suited to the complexity of educational change: a standard variation in factor X produces a variation in dependent variable Y, under certain specified conditions of time and place.* In plain English, meta-proposition three says that findings may be better stated conditionally so that results are known to apply to particular situations and in particular organizational settings.

This section contends that the past decade's research convincingly points to the necessity for such conditional explanations of variation in educational outcomes. The small number of research findings and studies cast in conditional terms will be reviewed, and a categorization for sorting factors into a conditional format will be advanced.

Inconsistencies and the Anatomy of Conditions. Averch, et al.'s (1974) comprehensive review of the literature found no consistent relationship between educational treatment and outcomes. That is, some studies showed that a treatment had positive effects, whereas other studies did not. This lack of consistency is in fact a finding, a significant--indeed consistent--finding of two decades of research. Similarly, Cronbach (1976) reviewed studies involving aptitude-treatment interactions and found widely inconsistent results. He attributes this instability to the extreme variation of interaction effects from school setting to school setting and from time to time.** Inconsistency of findings is not limited to relationships between "treatments" and student outcomes. It also is found for the effects of organizational variables (e.g., participation) on a broad range of measurements of success of innovative efforts in both educational settings and other organizational contexts (Downs and Mohr, 1976; Berman, 1978).

Though inconsistency is commonplace, its causes could be many, including weak measurements and ambiguous conceptualizations. Aside from these problems, which are not this paper's focus, context-dependency can lead to inconsistent results in several ways.

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*This form of conditional statement is perhaps the simplest form. More complex forms, including interactive and simultaneous formulations, will be discussed subsequently.

**Cronbach concludes that empirical social science laws of the usual type cannot be determined because of the vast number of interactions and their instability. Cronbach had earlier called for complex experimental designs that could test aptitude-treatment interactions (cf. Bracht, 1970), but he believed in 1976 that the interactions were too many, too complex, and too unstable.

First, if the context matters, does not vary within the sample of sites for each of two studies, and does vary between the two studies, then findings from the two studies can disagree. For example, the Rand study of 293 educational innovations found active involvement of principals and teacher participation in project decisions to enhance implementation, whereas the Rosenblum and Louis (1979) study of districts involved in the Rural Experimental Schools program found various measures of participation to have no significant or a somewhat negative effect on implementation. Ignoring, for the sake of this illustration, differences of conceptualization and measurement between the studies,* the opposite conclusions may be attributable to different contexts: the latter study dealt with rural schools, the former examined a national sample containing few rural schools.

It would have been appropriate for Rosenblum and Louis to have stated their finding in conditional terms of the form: in rural districts, participation of teachers and involvement of principals does not affect success. The Rand researchers also could have examined whether participation affected success differently in the few rural districts in their sample compared to non-rural districts. If they had, they might have found that participation did not matter in rural and did matter in non-rural areas, thereby resolving the discrepancy between the studies and adding to the validity of each. (Of course, they might have found the participation was important in both rural and non-rural districts.)

Second, if the context matters, varies within the sample of a particular study, and the variation is not taken into account, the study may produce spurious results. In other words, the study is making the error of not specifying the context as a variable. Such "specification errors" can, among other possibilities, wash out the effects of a variable. For example, if participation has a positive effect in non-rural areas and a negative effect in rural areas, if the proportion of rural and non-rural sites in a sample is about the same, and if the researcher ignores the rural variable, then a "finding" of no effect for participation might result despite a contrary reality. This simplified illustration is only one of many specifi-

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*For a review on participation, see Giacquinta, 1973 and Dachler and Wilpert, 1978.

cation errors that can produce inconsistency. At the risk of offering pious advice, better theoretical understanding of the process is the best way to reduce specification difficulties. In many cases, this understanding may allow a researcher to identify a context variable that should be considered in interaction with other factors, not simply ignored or controlled away. Such context variables will be called conditions in this paper.

Aside from aptitude-treatment research, few organizational analyses of educational change systematically examine interactions.* Daft and Becker (1978) study a number of interactions in their analysis of innovative high schools. For example, they consider the type of innovation adopted to interact with (i.e., is contingent or conditional on) the level of professionalism of the school (which is an example of what is here called a condition). Professionalism showed little if any relationship to the number of innovations adopted (which is the dependent variable); however, schools having a higher level of professionalism adopted more innovations of a curriculum or educational nature, whereas schools having a lower level of professionalism adopted more innovations of a purely administrative nature (which is an independent variable).

Berman and Pauly (1975) used elementary versus secondary schools as a condition and found, for example, that many implementation strategies, such as training, that were effective in elementary schools were not effective in high schools, and vice versa. Berman and McLaughlin (1977) used the type of innovative project as a condition. They found that support from the principal positively and strongly affected how well the project was implemented for relatively unstructured classroom organization type innovations, but not for structured individualization type projects. On the other hand,

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*Outside of education, an active literature under the name of contingency theory pursues topics similar to the ones discussed above. For reviews and applications, see Mohr, 1969; Downs and Mohr, 1978; Downs, 1978; Berman, 1980. Fiedler's work on leadership effectiveness (1964; 1972; 1976 and Bons; 1976 with Chemers and Makar) uses contingency theory for practical purposes--viz., training leaders. Lawrence and Lorsch, 1967 and Lorsch, 1977 provide examples of contingency theory applied to broader issues of organizational response and design.

they found that effective project directors were important to the implementation of structured individualization projects, not classroom organization innovations.

Rosenblum and Louis (1979) conducted an extensive interaction analysis and their results strongly indicate context-dependency. For example, they found that, for their sample of rural schools, "tension in a school may either facilitate or impede planned change, depending on the size of the school. Small schools characterized by high levels of tension between role partners are significantly less likely than other schools to be high implementors, while large schools with high levels of tension are significantly more likely to be high implementors". (p. 214).

Using the terminology proposed earlier in this paper, school size is the condition, tension is an independent variable, and degree of implementation is the dependent variable for this interaction analysis.*

A third source of inconsistency concerns the context indirectly. It was argued earlier that the same innovative idea is implemented differently in different sites (or contexts). More specifically, some characteristics of innovations do not vary from context to context: one example is cost in dollars. But many so-called attributes of innovations are not invariant: their value depends on the context and thus changes from site to site for the "same" innovative idea. For example, one item on Rogers and Shoemaker's (1971) list of attributes of innovations (important to adoption) is compatibility--i.e., how compatible the innovation is with the adopting organization. However, compatibility is not an intrinsic property of innovation but rather depends on the match between the innovation and the organizational context.** Moreover, the innovative idea changes over time. It becomes adapted and clarified, during implementation, so that the same innovative idea in the same site varies over time. Consequently, how compatible it

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*Rosenblum and Louis ran many interesting interactions, though not of the form suggested above. For example, they interact school size and percentage male, which are in our terminology both conditions--i.e., characteristics that are not subject to change by short-run policy decisions. This paper distinguishes between policy decisions and constraints, with the latter referred to as a condition.

**Down and Mohr (1976) refer to an invariant characteristic as a primary attribute and a characteristic that depends on the perceptions of members of the adopting organization--and thus varies with the context--as a secondary attribute.

is with the existing context also varies. Such variables are thus context and time-dependent; they will be called endogeneous variables.

Inconsistent results can arise when researchers treat endogeneous variables as if they were given and fixed inputs (which could be called exogeneous variables). A study that examines the success of an innovation in one site might come to the opposite conclusion of a study of the "same" innovation installed in a different site, because the substance of the innovation changes--indeed is defined--over time in each site and thus can be expected to diverge during implementation.

Several techniques can ease problems of inconsistency caused by endogenous variables. Endogeneous variables should not be treated as if they were a factor defined independently of the context. The substance of an innovation, for example, often should be defined in terms of the perceptions and practices of the users. Moreover, the unit of analysis for studying educational change should "no longer be the organization but the organization with respect to a particular innovation, no longer the innovation, but the innovation with respect to the particular organization." (Downs and Mohr, 1976, p. 706). Specifically, the unit of analysis should be the lowest organizational unit for which the substance does not change; in many cases, this unit is the teacher in a classroom because empirical studies have shown that the same innovation in a particular district and particular school often has different substance from classroom to classroom (Berman and Pauly, 1975; Pauly's analysis in Armour, et al., 1976).* Finally, measurements of endogeneous variables should be made at different times during the process. For example, the substance of a project during early periods of mobilization can be quite different from what is implemented and both can be quite different from the institutionalized innovation.

A final source of inconsistency is that the same factor could have different effects at different times or on different phases of the change process (Hage and Aiken, 1970; Zaltman et al., 1977). Some writers argue, for

*Downs and Mohr (1976) argue that if 10 innovations are studied in 100 organizations, the sample ought to be 1000. Given that users adapt innovations to their own context during implementation, Downs and Mohr's argument is not quite accurate. If 10 innovations are being studied in 100 school districts having an average of 100 teachers each, the sample ought to be 10x100x100 or 100,000.

example, the broad-based participation is deleterious at early stages of project development, but is helpful during implementation (Sopolsky, 1967; Corwin, 1973; Yin, 1979;). Among the few empirical studies of differential effects over time is Rosenblum and Louis (1979) who examined the effects of a number of factors (including participation) on both initiation and on implementation. Berman and McLaughlin (1977) analyzed the effects of factors on both implementation and institutionalization. Both studies also analyzed how various measures of implementation influenced institutionalization. These studies thus attacked the problem of time-dependency by using outcomes that measured interim process results (and they also considered some outcome measures or dependent variables to be endogeneous.*)

In summary, findings from research are often inconsistent because outcomes of the educational change process are context and time-dependent.

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*More precisely, many studies cited earlier use measures of process, not simply input-output measures such as student achievement. For example, measures of the effectiveness of implementation and of change in teacher behavior attempt to assess interim effects. Such measures are really cause and effect of both factors and outcome, but the literature seldom attempts to treat them in this simultaneous manner. Berman and Pauly (1975) and Berman and McLaughlin (1977) offer a simultaneous approach, which is described in the latter work as follows:

> . . .because a project is likely to mutate during the implementation, its effectiveness after four or five years depends not only on its initial design but also on its evolution. In turn, its evolution depends on characteristics of the innovation and its institutional setting. In other words, the implemented project should be treated as both an independent and a dependent variable in a system of relationships. Consequently, the effectiveness of implementation will be analyzed, on the one hand, as a function of the factors identifed earlier, and on the other hand, as a factor affecting teacher change, continuation of method and materials, and student improvement. . . Moreover, teachers may learn from and adapt to the project during implementation in ways the original designers may or may not have intended. Such changes in teaching style or behavior constitute an outcome of the project as it was implemented. Furthermore, improved student performance and continuation of project methods or materials depend on the teacher's style and behavior as they were both before and as a result of the project. Therefore, the change in the teacher's behavior can be classed as both cause and effect in the system of relationships determining what happens to an innovation. (pp. 45-46).

CATEGORIZATION OF EXPLANATORY VARIABLES

The preceding section's intention should not be misconstrued. Though several ways were suggested to sort out inconsistencies across studies, I did not mean to imply that costing analysis in conditional forms (for example, interactions and simultaneous equations) would "solve" the problem: it might help reduce the prevalence of findings, but at the cost of limiting our ability to generalize.

The crux of the matter is this: the number of significant interactions among variables may be too numerous and too complex to develop and test powerful generalizations or unified theory. In the extreme, so many conditions about the context may have to be stated (to insure a reasonable level of push-type causal explanation and prediction) that "findings" would hold only for individual districts--or indeed, individual schools.

I am not convinced, however, that the case for this nominalistic extreme has yet been demonstrated. The past decade's progress on understanding educational change processes suggests a more optimistic assessment. I expect we will be able to develop limited, time-bound generalizations and partial theories within broad classes of contextual conditions.

For example, it may be that educational change occurs so differently in elementary schools as compared to secondary schools (particularly in urban areas) that essentially different theories are needed. Similarly, schools in rural areas may have distinctively unique dynamics as compared to schools in non-rural areas.* These two gross conditions are, of course, obvious, and several other potentially major conditions could easily be mentioned--e.g., community, demographic, and student characteristics--without even introducing less obvious but perhaps more powerful organizational characteristics. The number of such conditions, together with other plausible variables, quickly becomes too large to encompass within a single, feasible sample (particularly if higher level interactions are considered). The alternative is to draw samples and conduct research within

*Even this illustration is far from simple in operational terms because the organizational characteristics of rural school districts (and the regional cooperatives that assume administrative functions for many of them) are in flux. Moreover, the definition of rural itself raises serious questions (Bass and Berman, 1980).

a selected contextual category--e.g., rural elementary schools in stable environments--and to limit generalization to that category. Insofar as consistent results accumulate within a category, findings and limited theories could be compared across categories.

Let me state the argument succinctly. Given the inherent complexity of educational change, the long road to more useful variance findings requires several steps: (1) the categorization of variables into types that reflect their status in the educational change process; (2) the development of a taxonomy of contextual conditions; (3) the deliberate selection of samples to do research within contextual categories; (4) analysis within categories that take into account such issues as interactive, endogenous, and simultaneous relations; (5) comparison of findings across categories.

In part, the last section suggests how to think about the first step, the categorization of different types of variables so as to claify their context and time-dependency. Table 1A classifies variables that could affect the educational change process into five broad groups; Table 1B provides illustrations of these categories.

The first category, local contextual conditions, represents variables that are relatively fixed for each school district--e.g., over a three to five year period--but differ across school districts. These conditions are constraints inherent in the context of school districts. Table 1B, which enumerates factors that the literature suggests are important to the outcomes of educational change policies, divides these contextual conditions into regular or stable characteristics of (a) the district's organization, (b) the subsystem implementing a change effort (e.g., one or more elementary schools along with support staff), (c) the relevant student population, and (d) the affected local community. A taxonomy of contextual conditions for the purpose of doing comparative research could be drawn from these categories.

The other condition listed in the table is the class of variables associated with an innovation itself. Many critical aspects of change efforts are adapted and clarified during the process of change, as discussed earlier, and are, therefore, endogenous variables listed under category III. But some aspects do not change over time. This invari-

TABLE 1A

CATEGORIZATION OF FACTORS

I. Local Contextual Conditions

II. Primary Attributes of Change Effort

III. Local Policy Choices

IV. Endogenous Variables

V. External Factors (i.e., Outside Variables Subject to Change During Implementation)

TABLE 1B

CATEGORIZATION OF FACTORS AFFECTING EDUCATIONAL CHANGE
Illustrative Variables Suggested by Literature

I. Local Contextual Conditions

- o district characteristics (e.g., school board traits, leadership of administration, organizational structure, level of professionalism, organizational health, size, financial status, priorities)
- o characteristics of implementing subsystem (e.g., elementary or secondary, size, leadership traits, staff attributes, organizational climate)
- o student characteristics
- o community characteristics

II. Primary Attributes of Change Effort

- o core substance of technology
- o certainty of technology
- o complexity of change effort
- o scope of change effort
- o centrality of change effort
- o cost

III. Local Policy Choices

- o participation strategies
- o staff development activities
- o coordination, control, communication procedures
- o evaluation methods
- o support generation strategies
- o use of outside assistance
- o extent of local materials development

IV. Endogenous Variables

- o attitude of users over time
- o attitude of key actors over time (e.g., administrators, board members)
- o evolution of policy image
- o support for change effort
- o extent and quality of planning
- o degree of conflict over change effort

- o community involvement
- o clarity about innovation
- o change in user behavior, organizational arrangements, and technology

V. External Variables (i.e., Outside Variables Subject to Change During Implementation)

- o stability of funding
- o federal and state regulations
- o episodic changes in context (e.g., new superintendent, new principal, teacher strike, Proposition 13)

ant core, or group of primary characteristics, constrains how much adaptation occurs. For example, projects that begin as reading programs generally wind up as reading, not math, programs; open education innovations are unlikely to become highly structured pull-out projects; low funded innovations are unlikely to evolve into massive change operations with high expenditures. Researchers do not yet know how to isolate the core from those aspects subject to adaptation and clarification. Nonetheless, it seems obvious that the process and outcomes of educational change are conditioned by constraints inherent in the technology that school districts choose to implement (Majone and Wildavsky, 1978).

The third class of variables is called local policy variables, which refers to choices that school districts and their members make. Research has conclusively shown that such strategic choices matter to the course and result of change policies (Fullan and Pomfret, 1977). The items listed in the table represent choices often mentioned in the literature as significant. Yet, it is hard to take anyone of these strategies and find consistent evidence that they work all the time under all conditions.* The problem for researchers then is to state which strategies work under what contextual conditions (category I) and for which attributes of change efforts (category II).

For example, Berman (1978 and 1980) proposes that broad-based participation is appropriate under the conditions of relatively unstructured innovations characterized by high uncertainty and complexity (e.g., differentiated staffing or open education), but may be inefficient and harmful for highly structured innovations.** Moreover, he suggests that the choice to use participative strategies should depend on the extent of agreement over the change policy among members in the local setting and on the nature of the district's administrative system.

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*The factors listed are, of course, not operational concepts, but simply suggestive and directionless categories. It is assumed that operational measurements could be made from these abstract factors.

**Specifically, Berman argues that unstructured innovations require an adaptive implementation strategy, of which broad-based participation would be an essential element; structured innovations could be handled, in contrast, by a programmed strateg, provided that contextual conditions were suitable.

Fullan (1979) makes a parallel argument referring to educational innovations, as do Britain (1979) and Delbecq and Gill (1979) discussing evaluation issues in other social policy arenas. Interaction analysis of the type discussed earlier would be appropriate to explore those conditional hypotheses.

The point, of course, is not to test all possible interactions--an infeasible and unfruitful undertaking. Rather, interactions should be selected that relate directly to practice. The examination of local policy choices conditioned on (i.e., interacted with) contextual constraints and primary attributes of innovations may lead to partial theories that are relevant to officials who make choices within their own reality.

The remaining two categories, endogenous and external variables, were discussed earlier, and no more than a brief mention needs be made of them. The main consideration is that research should move toward taking into account process variables that necessarily change over time. For instance, the least researchers could do is distinguish between the initial change effort (comprised of the original policy, planned organizational arrangements, and adopted technology) and the state of the change effort at later times during or after implementation (i.e., the evolved policy, the actual change in organizational arrangements, and the implemented technology). Similarly, the evidence clearly indicates that participants' understanding of and attitude toward a change effort alters during implementation (Smith and Keith, 1971; Gross in Herriott and Gross, 1979). The apparent importance of such time-dependent variables argues for longitudinal research that can both observe the change process and make measurements necessary to more sophisticated variance analysis.

The comparative approach outlined above offers no guarantee of the eventual emergence of a unified theory of educational change. Instead, it accepts lowered expectations for research findings. By limiting generalizations, making sensible distinctions among different types of variables, experimenting with time-dependent measurements and longitudinal research designs, and structuring analysis in conditional forms, researchers might be able to reduce inconsistency across studies and produce results relevant to policy and practice.

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